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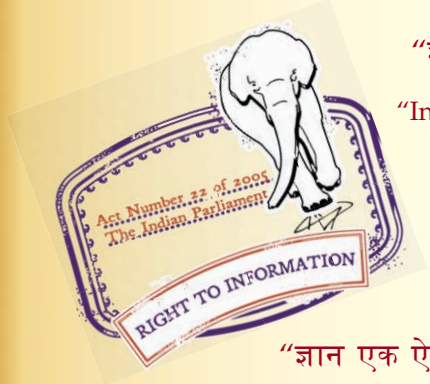
IS 9080-2-3 (1981): Safety requirements in electro-heat installations, Part 2: Particular requirements for resistance heating equipment, Section 3: Protection in potassium and sodium nitrate and nitrite bath furnaces [ETD 17: Industrial Electroheating Equipment]



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(Reaffirmed 2001)

Indian Standard

SAFETY REQUIREMENTS IN ELECTRO-HEAT INSTALLATIONS

PART II PARTICULAR REQUIREMENTS FOR RESISTANCE HEATING EQUIPMENT

Section 3 Protection in Potassium and Sodium Nitrate and Nitrite Bath Furnaces

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SAFETY REQUIREMENTS IN ELECTRO-HEAT INSTALLATIONS

PART II PARTICULAR REQUIREMENTS FOR RESISTANCE HEATING EQUIPMENT

Section 3 Protection in Potassium and Sodium Nitrate and Nitrite Bath Furnaces

0. FOREWORD

0.1 This Indian Standard (Part II/Sec 3) was adopted by the Indian Standards Institution on 12 January 1981, after the draft finalized by the Industrial Electroheating Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard forms Section 3 of Part II covering the requirements for protection in potassium and sodium nitrate and nitrite bath furnaces. The other parts of the series are as follows:

Part I	General requirements
Part II	Particular requirements for resistance heating equipment
Sec 1	Protection in direct resistance heating installations
Sec 2	Protection in indirect resistance heating installations
Sec 4	Protection in installations used for drying varnishes and other similar products
Part III	Particular requirements for mains and medium frequency induction furnace installations
Part IV	Particular requirements for arc furnace installations

0.3 Nitrate and nitrite bath furnaces are salt-bath furnaces containing in metallic ladles or crucibles, potassium or sodium nitrate or nitrite baths or baths composed of a mixture of these salts. Even though this standard allows bath temperatures up to 595°C (*see* **3.1**), precautions are required for temperatures exceeding 550°C.

0.4 In preparing this standard considerable assistance has been derived from IEC Pub 519-2(1975) ' Safety in electro-heat installations: Part II Particular requirements for resistance heating equipment ' issued by International Electrotechnical Commission.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part II/Sec 3) applies to potassium and sodium nitrate and nitrite baths used for heat treatment of metals and their alloys.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Internal Heating — When heating elements are arranged inside the salt bath (immersed heating elements, electrodes).

2.2 External Heating — When heating elements are arranged outside the ladle or crucible.

3. CONSTRUCTION AND INSTALLATION DETAILS

3.1 Protective Devices — In order to control the temperature and to avoid overheating, the maximum admissible temperature shall be clearly indicated on the dial-plates of temperature indicators or controllers; in no case shall it exceed 595°C. When a temperature higher than 595°C is necessary in baths intended for steel, a clearly visible notice shall be placed in the vicinity, reading: 'Not applicable for light metals'.

In the case of sodium and potassium nitrate and nitrite baths for heat treatment of steel, the temperature recording device may be omitted and at rated temperatures below 500°C, the temperature limiter can be omitted.

3.2 Abnormal Operating Conditions — In order to avoid accidental overheating in the event of a fault in the temperature controlling system,

*Rules for rounding off numerical values (*revised*).

the temperature limiting device must automatically switch off the heating by means of a special circuit breaker and, in addition, activate an alarm device. The switching off shall be total for all the feeding conductors and the position of the circuit breaker shall be clearly shown.

3.3 Heating Elements

3.3.1 In internally heated potassium and sodium nitrate and nitrite baths, the immersed heating elements or electrodes shall be arranged in such a manner that they remain remote from the slime formed during operation. In the case of baths of depth exceeding 1·5 m if no other precautions are taken, to ensure heating up without hazard, heating devices shall be provided for the purpose of forming vertical channels in the solidified charge by melting.

3.3.2 In externally heated sodium and potassium nitrate and nitrite baths, the heating elements shall be fixed only on the sidewalls. They shall be so arranged as to avoid any local overheating.

4. OPERATION

4.1 When sodium and potassium nitrate and nitrite baths are used for the thermal treatment of metal, it is necessary to comply with the Indian Standards if any, concerning prevention against accidents.

4.2 Equipment should be provided with danger indicators, at least one of which shall be placed outside the immediate proximity of the dangerous zone.

4.3 It is necessary to avoid overheating of the bath which can cause ignition or calcination in the case of iron components and explosions in the case of light metals; overheating can be due, in particular, to slime sediment.

4.4 All necessary precautions shall be taken to avoid the introduction of water or of lubricants into the sodium and potassium nitrate and nitrite baths.

INDIAN STANDARDS

ON

INDUSTRIAL ELECTRO-HEATING EQUIPMENT

IS:

1885 (Part LI/Sec 1)-1979 Electrotechnical vocabulary: Part LI Industrial electro-heating, Section 1 General terms

1885 (Part LI/Sec 2)-1979 Electrotechnical vocabulary: Part LI Industrial electro-heating, Section 2 Resistance heating

8992-1978 Test methods for induction furnaces with submerged channels

9021-1978 General test conditions for industrial electro-heating equipment

9029-1978 Methods of tests for batch furnaces with metallic heating resistors

9050-1979 Nominal dimensions of cylindrical machined graphite electrodes with threaded sockets and connecting pins for use in electric arc furnaces

9080 (Part I)-1979 Safety requirements in electro-heat installations: Part I General requirements

9080 (Part II/Sec 1)-1979 Safety requirements in electro-heat installations: Part II Particular requirements for resistance heating equipment, Section 1 Protection in direct resistance heating installations

9080 (Part III)-1979 Safety requirements in electro-heat installations: Part III Particular requirements for mains and medium frequency induction furnace installations